INCREASING COLORECTAL CANCER SCREENING REFERRALS IN A PRIMARY CARE CLINIC

by

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Abstract

Colorectal cancer (CRC) is one of the leading causes of death worldwide and the second leading cause of cancer-related deaths in the United States. When diagnosed early, CRC has a 90% 5-year survival rate. Despite the increasing availability of CRC screening, only an estimated 62% of adults aged 50-75 years are up to date on testing and only 40% of those with the disease are detected at a treatable stage. Focusing screening efforts of primary care providers is critical in early detection and treatment of CRC. The purpose of this quality improvement project was to increase provider referrals of CRC screening to patients aged 50-75 years old by implementing a provider reminder system by utilization of a questionnaire. Over a twelve-week period, a total of 62 (25%) patients received a questionnaire and 17 (27%) were referred for screening. Although staff compliance in distributing questionnaires was only 25%, provider compliance for recommending screening for those who received the questionnaire was 100%. The overall goal of this project was to increase the number of patients being screened for CRC, thus improving patient care and reducing mortality. Reminding providers to routinely refer their patients for CRC screening is an effective way to improve screening rates in primary care settings.

Key words: colorectal cancer; provider reminder; standardized screening; provider referral

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Chapter One: Overview of the Problem of Interest

Colorectal cancer (CRC) is cancer of the large intestine and is one of the leading causes of morbidity and mortality worldwide. This chapter discusses the background and implications of colorectal cancer. There will be emphasis on the importance of screening as well as the different types of screening methods available. Gaps in primary care practice for CRC screening will be also be examined. This project's focus was on establishing an intervention in a primary care clinic that resulted in increased provider referral of CRC screening.

Background Information

Colorectal cancer (CRC) is responsible for over 600,000 deaths a year (Brenner, Kloor, & Pox, 2014). It is the second leading cause of cancer-related deaths in the United States and the third most common cancer globally, with between one and two million new cases presenting every year (Brenner et al., 2014; Strain, Waling, & Steward, 2018). Strain et al. (2018) reported that the United States Preventative Services Task Force (USPSTF) predicted that in 2016, 134,000 people in the United States would be diagnosed with CRC, and 49,000 people would die from it.

There are multiple risk factors for CRC, including smoking, excessive alcohol use, obesity, and family history (Brenner et al., 2014). Having a first degree relative with CRC doubles the likelihood of developing the cancer (Geneve et al., 2018). Those with inflammatory bowel disease, as well as those who have had abdominal radiation during childhood, are more susceptible to the development of colorectal carcinoma (Geneve et al., 2018). Incidence of the disease is higher in men than women, and the majority of cases reported are in North America, Europe, and Oceania (Brenner et al., 2014). Of all ethnic groups, African Americans have the highest incidence of CRC (Geneve et al., 2018).

According to Brenner et al. (2014), the stage of CRC at the time of diagnosis is the most critical factor in terms of survival rates and prognosis. Evidence shows that CRC progresses slowly, but when patients present with symptomatic CRC, the prognosis is typically poor (Brenner et al., 2014). When diagnosed in its early stages, CRC has a 90% 5-year survival rate; however, only 40% of people with the disease are detected at a treatable stage (Geneve et al., 2018). Because of the slow progression but fatal metastasis when not treated, screening is vital for early detection and treatment of CRC.

There are multiple CRC screening methods available, including invasive and non-invasive tests. To increase CRC screening, providers need to offer more than one option for screening to be successful in reducing mortality (Bibbins-Domingo et al., 2016). Invasive, direct visualization methods include colonoscopy, computed tomography (CT) colonography, and flexible sigmoidoscopy (Bibbins-Domingo et al., 2016). Non-invasive, stool-based tests include the fecal immunochemical test (FIT) and the FIT-DNA test (Bibbins-Domingo et al., 2016). Colonoscopy is considered the "gold standard" of all the screening methods because of its accuracy, with 80-95% sensitivity and 95-100% specificity (Geneve et al., 2018). The most sensitive non-invasive test is the stool DNA test, or Cologuard, with 92% sensitivity and 90% specificity (Rex et al., 2017). Evidence suggests that having fecal blood tests as an option for screening significantly increases screening rates (Dougherty et al., 2018). There are multiple screening methods available, each having its advantages and disadvantages. There is no evidence that any of these methods provide a greater net benefit than the other in reducing CRC (Bibbins-Domingo et al., 2016). According to Bibbins-Domingo et al. (2016), the USPSTF current guidelines state that "the best screening test is the one that gets done" (p. 2573), and that

maximizing the number of people that receive screening of any kind will reduce colorectal cancer deaths.

Significance of Clinical Problem

Evidence proves that screening adults ages 50 to 75 years old for CRC significantly reduces mortality rates. Over the past several years, screening methods and treatment strategies have greatly improved, resulting in over one million CRC survivors in the United States alone (Geneve et al., 2018). In the past decade, incidence and mortality from CRC have decreased by approximately 3% per year, reinforcing the effectiveness of screening (Geneve et al., 2018). Despite the vast amount of options for CRC screening, the rates remain relatively low in the general population (Geneve et al., 2018). Dougherty et al. (2018) report that only 62% of adults aged 50-75 years are up to date on testing and that compliance is even lower in minorities and the underinsured.

The underuse of screening has brought national attention to public health campaigns to examine interventions that increase CRC screening uptake (Dougherty et al., 2018). The National Colorectal Cancer Round Table (NCCRT) began a nationwide initiative aimed at increasing CRC screening rates to 80% in every community by 2018 (Dougherty et al., 2018).

The literature demonstrates the need for increasing CRC screening, and this starts with primary care providers. Evidence shows that a recommendation from a provider greatly influences a patient's decision to be screened (Alberti, Garcia, Coelho, De Lima, & Petroianu, 2015). Although providers acknowledge and understand the importance of CRC screening, there is a gap in practice for screening patients during visits (Alberti et al., 2015). If providers were to consistently educate their patients about CRC risks, guidelines, and test options during their

appointments, screening rates would increase (Alberti et al., 2015). A rise in screening rates would result in a decline in preventable deaths.

Question Guiding Inquiry (PICO)

A primary care clinic in suburban North Carolina did not have a protocol in place for routinely referring patients for CRC screening. The practice's providers expressed concern that not all adults aged 50-75 years old were participating in colorectal cancer screening. The providers believed that by offering the non-invasive stool test, Cologuard, and implementing a provider reminder to discuss screening with patients, screening rates would increase (Personal communication, February 4, 2019). They believed that utilizing a patient questionnaire would help identify the unscreened patients and serve as a reminder to providers to discuss and recommend CRC screening with that patient.

Population. The population this project worked with were the clinicians and staff at a primary care clinic in a suburban area of Charlotte, NC. The team included two secretaries, a medical office assistant (MOA), two doctors, and a physician's assistant.

Intervention. The secretary and MOA distributed a colorectal cancer screening (CRC) questionnaire and education pamphlet to patients aged 50-75 years old who entered the office. The questionnaire included questions about health history that excluded patients from Cologuard screening. The patients took completed questionnaires to the provider, and the provider determined whether he or she was a candidate for Cologuard or colonoscopy screening. Each questionnaire included a section that the provider completed indicating whether the patient was referred for Cologuard or colonoscopy, or whether he or she refused or was up to date on screening. Questionnaires were collected bi-weekly, and the DNP student recorded how many

patients aged 50-75 came in the office versus how many surveys were completed. The responses were categorized and documented.

Comparison. There was no standardized practice in place at the primary care clinic for screening patients for CRC. Providers individually referred patients for screening, but there were no records available to compare how many patients were eligible for screening versus how many were screened. The goal for this quality improvement (QI) project was to increase provider CRC referral rates by improving the practice's approach for assessing all appropriate patients for CRC screening.

Outcome(s). An outcome evaluated in this project was the compliance of staff to distribute questionnaires to the appropriate patients. The number of patients ages 50-75 years old who came into the office versus how many were given the questionnaire was tracked by the DNP student to assess compliance. Another outcome evaluated was whether the provider utilized the questionnaire to guide his decision on recommending CRC screening for the patient. Provider utilization of the questionnaire was tracked by assessing how many submitted questionnaires were filled out by both the patient and physician.

Summary

Colorectal cancer is a common cause of death worldwide that can be prevented by routinely screening patients. There are many options for CRC screening, including invasive and non-invasive methods. Colonoscopies remain the gold standard in testing, but according to recent guidelines, any type of CRC screening is beneficial in detecting and treating cancer at the early stages. Having the option of a non-invasive test has proven to increase screening rates. Although the literature supports the effectiveness of screening in reducing the incidence and mortality of CRC, rates remain below the target goal. By educating patients and instilling a

provider reminder to discuss CRC screening with eligible patients, primary care clinics can increase CRC screening rates drastically. By utilizing screening in the general population, CRC can be detected in its early stages when it is easy to treat, leading to a decrease in CRC related deaths.

Chapter Two: Review of the Literature

The literature review on methods to increase colorectal cancer screening in primary care facilities indicated that multiple interventions are effective. Providing various screening options, using a provider reminder system, and provider recommendations are evidence-based interventions that influence CRC screening uptake. Patient education and instilling awareness about colorectal cancer and the importance of screening also facilitates adherence. These interventions, their effectiveness, and their limitations are reviewed in this chapter.

Literature Appraisal Methodology

Sampling strategies. A literature review was conducted using PubMed, Ovid, and Cumulative Index to Nursing and Allied Health Literature (CINAHL) to explore several topics including colorectal cancer, colorectal cancer screening, provider reminders, and small media. Filters for free full-text publications written in English within the last five years were applied to all searches. A search in PubMed using Medical Subject Heading (MeSH) terms colorectal neoplasms, primary health care, and secondary prevention OR screening OR cancer screening OR early detection yielded 1203 results. Once reminder system was added, the results narrowed to 20. A keyword search in CINAHL using colorectal cancer, cancer screening, primary care provider OR family physician yielded 156 results. After adding reminder system, there were four results. Another search using the same keywords as in CINAHL yielded 134 articles. After adding reminder systems, eight articles were generated. A search in PubMed using the keywords colorectal cancer screening and small media resulted in 53 articles. The same search in CINAHL yielded eight articles, and in Ovid produced ten articles. A total of 13 articles were used for examining proposed interventions, as well as gathering background data and statistics about colorectal cancer.

Ongoing search strategies, including joining the National Colorectal Roundtable list-serve and the National Center for Biotechnology Information (NCBI), were conducted to remain current on recent literature. Emails with new research pertaining to continuing education on this topic were received regularly and incorporated into the project.

Evaluation criteria. The articles were first evaluated based on population. Articles focused on the general adult population aged 50-75 because this age range is the recommended CRC screening age. Interventions in the project pertain to all average-risk individuals and are not specific for one group. Therefore, articles were excluded if they primarily focused on a particular population, such as minorities, low socioeconomic class, medically vulnerable, uninsured, or immigrants.

Interventions were performed at English-speaking primary care clinics in the United States. Articles that focused on CRC screening in a non-English speaking society were excluded. Many studies focused on other interventions to increase CRC screening, such as text message reminders. Thus, if the article did not discuss one of the previously proposed interventions, it was excluded.

Clinical decisions are based on evidence in the literature. However, high-quality evidence is needed to support clinical interventions or recommendations. Melnyk & Fineout-Overholt's hierarchal system of classifying evidence is used to determine levels of evidence (Haberstroh & Sewell, 2018). This model includes seven levels of evidence, where level one indicates the strongest recommendation for practice. Systematic reviews of randomized controlled trials (RCT's) are level one evidence, whereas opinions or reports of expert committees are level seven evidence (Haberstroh & Sewell, 2018).

Levels of evidence used were one, four, five, and seven. Resources that discussed evidence-based interventions that previous high-level studies had determined to be effective were included, even though they did not necessarily conduct their own study. Articles with personal opinions or bias were excluded. Articles that did not use high level of evidence resources were also excluded (see Appendix A).

Literature Review Findings

In reviewing the literature, a wide range of evidence was found regarding CRC screening and interventions used to increase uptake in a primary care clinic. Clinical guidelines, systematic reviews and meta-analyses, descriptive studies, and recommendations from nationally recognized task forces were all included. Articles were ranked higher based on its level of evidence as well as overall relevance to the topic at hand.

Screening Methods. Cancer screening is used to detect and diagnose disease in its early stages before symptoms present, thus leading to early treatment and a better prognosis. Colorectal cancer screening is unique from other cancer screenings in the fact that there are multiple available options. The USPSTF recently changed its CRC screening recommendation from including preferred types of screening methods to highlighting the fact that CRC screening provides substantial benefit to those 50 to 75 years old (Bibbins-Domingo et al., 2016). The current recommendation acknowledges that a universal approach is not appropriate for CRC screening. The method best for the patient should be individualized and use shared decision making between the provider and the patient (Bibbins-Domingo et al., 2016). Although a colonoscopy is still considered the "gold standard" due to its high sensitivity and specificity, it is evident that more than 20 million people do not follow this screening recommendation (Strain et al., 2018). Barriers associated with a colonoscopy include the greater time commitment needed

for bowel preparation, discomfort associated with the procedure, and the risk of perforation (Honein-AbouHaidar et al., 2016). However, some prefer colonoscopies because it allows for longer time between screening than stool-based tests (Bibbins-Domingo et al., 2016).

Literature demonstrates that some patients find stool-based tests more appealing than direct visualization tests because of the limited preparation involved and the convenience of completing an at-home test (Strain et al., 2018). According to Dougherty et al. (2018), 68.8% of participants underwent screening when able to choose the method, whereas 58.1% participated when only offered a colonoscopy. The two stool-based screening methods used are FIT and FIT-DNA, or Cologuard. These both have their advantages and limitations. When compared side by side in a study, Cologuard was more sensitive than FIT in detecting CRC, advanced adenomas, sessile-serrated adenomas/polyps, nonadvanced findings, or negative findings (Strain et al., 2018). However, FIT has higher levels of specificity at 94%, compared with Cologuard, which has a specificity of 90% (Strain et al., 2018). With a lower specificity, Cologuard has a higher false positive rate and may result in more follow up colonoscopies (Strain et al., 2018). Nevertheless, some suggest the use of Cologuard before a colonoscopy because of its ability to detect proximal and distal lesions of the colon (Strain et al., 2018). Colonoscopies frequently miss proximal lesions, and neither FIT nor colonoscopies are sensitive enough to identify precancerous lesions (Strain et al., 2018).

Another consideration for these tests is cost. Cologuard is approximately $600 whereas FIT is about $20. However, Medicare and several private insurers have approved Cologuard for reimbursement at 3-year intervals (Rex et al., 2017). The cost-effectiveness of Cologuard versus other cancer screening tests, such as annual mammograms, was comparable (Strain et al., 2018).

In assessing overall cost effectiveness, FIT and Cologuard were both determined to be more cost effective than colonoscopies (Strain et al., 2018).

Although the USPSTF guidelines do not recommend one test over the other, the U.S Multi-Society Task Force of Colorectal Cancer (MSTF) rank screening options in three tiers based on performance features, costs, and practical considerations (Rex et al., 2017). The first tier includes colonoscopy every ten years or FIT yearly for those who refuse colonoscopy (Rex et al., 2017). The second tier includes Cologuard every three years, CT colonography every five years, and flexible sigmoidoscopy every five to ten years (Rex et al., 2017). Capsule colonoscopy is ranked as a third-tier test (Rex et al., 2017).

At the site of project implementation, the providers chose to recommend Cologuard or colonoscopy to their patients. Although literature discusses the advantage of offering more than just colonoscopy, it is also evident that FIT could be a good option for some patients. Because all insurance plans do not cover Cologuard, some patients may choose to not participate in this screening method. However, offering an alternative to colonoscopy is shown to increase screening.

Provider Reminder. Through evidence-based research and systematic reviews, the Community Preventative Services Task Force [CPSTF] (2016) found multiple intervention approaches that were effective in increasing colorectal cancer screening. Examples of these interventions include client reminders, small media, one-on-one education, reducing structural barriers, and using provider reminders (CPSTF, 2016). While twelve interventions are discussed, evidence suggests that using a combination of two or more strategies has the most significant effect on increasing CRC screening (CPSTF, 2016). Provider reminders help prompt providers to discuss CRC screening and can be provided in different ways, such as in the

electronic medical record, email, or by paper (CPSTF, 2016). Multiple meta-analyses discuss and prove the effectiveness of provider reminders in increasing CRC screening (Triantafillidis, Vagianos, Gikas, Korontzi, & Papalois, 2017). In a systematic review of five studies, results demonstrated that CRC screening percentages were higher when a provider reminder was used (Triantafillidis et al., 2017). Lastly, a systematic review of eight studies that all included clinician reminders to screen for CRC showed an increase of 13% in screening participation (Dougherty et al., 2018).

At the project site, a questionnaire asking patients about their specific risk factors and history of screening was provided to all patients ages 50-75 years old (see Appendices B and C). It was then taken into the appointment with the provider, who reviewed the answers and determined if the patient needed CRC screening and which method was best. This questionnaire served as the providers' reminder to screen their patients. The literature does not specify the most effective way to provide reminders to clinicians; however, evidence shows that an alert via electronical medical records (EMR) stating that the patient is due or overdue for screening has been associated with a significant increase in screening (Triantafillidis et al., 2017). An EMR alert system is not possible at the project implementation site. Specific literature that examines the use of a paper questionnaire as the reminder does not exist.

Provider Recommendation. According to the American Cancer Society (n.d.), a provider recommendation is the most instrumental factor in determining whether a patient gets screened for CRC or not. In a systematic review of the impact providers have on cancer screening adherence, evidence demonstrates that provider recommendations drastically increase screening rates (Peterson et al., 2016). One survey showed that the number one reason African Americans did not participate in CRC screening was because their provider did not recommend it

(American Cancer Society, n.d.). In another study, a provider recommendation proved to be one of the key motivating factors for participating in CRC screening (Triantafillidis et al., 2017).

By utilizing a questionnaire as a provider reminder to screen for CRC, this intervention increases the chance that the provider will discuss and recommend screening to his or her patients. Honein-AbouHaidar et al. (2016) found that providers who addressed the importance of screening positively influenced CRC screening by raising awareness. Although the literature does not show that the use of a questionnaire will result in a recommendation from the provider, it is under the assumption that reminding the provider of screening will initiate a referral for the patient.

Small Media. The use of small media is another evidence-based intervention that has proven to increase CRC screening by educating and motivating patients (CPSTF, 2016). Small media can be anything from a video, pamphlet, newsletter, brochure, or office poster (CPSTF, 2016). These do not have to be patient specific and can be distributed at a primary care office. In a systematic review of facilitators and barriers related to CRC screening, it was determined that a lack of awareness of and understanding of the purpose of screening was one of the main obstacles (Honein-AbouHaidar et al., 2016). Many patients are unaware of the prevalence, risk factors, and prevention methods associated with CRC (Honein-AbouHaidar et al., 2016). Conversely, Honein-AbouHaidar et al. (2016) found that one of the leading facilitators to CRC screening was understanding the purpose of screening, as well as when to start and the different options for testing. In an analysis of 94 studies, the authors discovered that colorectal cancer awareness was a critical factor for screening participation (Honein-AbouHaidar et al., 2016). Triantafillidis et al. (2017) found that by inquiring about the patient's risk factors and providing them education before their appointment with the provider increased CRC screening uptake.

Dougherty et al. (2018) conducted a systematic review and meta-analysis of interventions used to increase CRC screening, and concluded that patient education increased screening uptake. Furthermore, the authors found that combining patient education with an additional intervention, as the CPSTF recommends, increased rates even more (Dougherty et al., 2018).

Although the CPSTF (2016) includes small media as an evidence-based intervention to increase CRC screening, the findings were only based on the use of stool-based tests, not colonoscopy or other invasive modalities. A patient education brochure containing information about CRC and screening options will be distributed with each questionnaire at the project implementation site (see Appendix D).

Limitations of Literature Review Process

One of the challenges to this literature review was that many of the studies were population specific. For example, a lot of the interventions focused on a certain group, such as Hispanics, African Americans, non-English speaking patients, and those with low socioeconomic status. Although the clinic this project is taking place in will have ethnically diverse patients, the population focus is average risk individuals aged 50-75, regardless of ethnicity or socioeconomic status. Another challenge was that much of the literature discussing evidence-based interventions were over five years old. Although still pertinent, some of the studies were not considered based on the date of publication.

Discussion

Conclusion of findings. After reviewing the literature regarding colorectal cancer screening, it was evident that multiple evidence-based interventions can be used in a primary care setting to increase screening uptake. It was emphasized that using various interventions instead of a single intervention will yield better results. For this reason, the project used several

interventions that complemented each other in hopes to increase provider referrals for CRC screening, as well as patient uptake.

Different patients have different preferences when it comes to cancer screening, which is supported by evidence showing that offering patients options in screening methods increases uptake. Also, offering less invasive screening methods is related to increased screening rates. The project site will recommend two screening methods: colonoscopy or Cologuard.

There are multiple items primary care providers need to address when seeing patients, so it is not surprising that screening for CRC sometimes gets forgotten. Reminding providers to screen their patients has been associated with an increase in screening rates. Provider recommendation has also been proven to increase screening. By utilizing a questionnaire that indicates CRC screening history, as well as risk factors, providers were reminded to discuss and recommend screening to the appropriate patients.

Educating patients about health maintenance and recommended screenings is essential in primary care. By increasing awareness of colorectal cancer, screening guidelines, and test options, patients are more likely to participate in screening. An education pamphlet was distributed upon check-in at the project site to help raise awareness of CRC and screening.

Advantages and disadvantages of findings. Many advantages exist regarding the proposed interventions. First, the questionnaire was a quick and easy form to fill out that only took a couple of minutes. Second, it was easy to understand, so those with only a grade school education were able to understand it. Third, the use of a questionnaire and education pamphlet were not costly and were easy to implement. Lastly, the providers were able to quickly assess and recommend the best screening option for the patient.

One disadvantage to the proposed intervention was that it required staff compliance with distributing the materials to eligible patients in order to be effective. Also, while literature supports the use of provider reminders, there was no specific study that used a paper questionnaire as the reminder system.

Utilization of findings in practice change. The creation of a questionnaire to assess patient risk factors and screening history was useful in this primary care clinic by serving as a reminder to providers to screen their patients. The receptionist gave all patients ages 50-75 years old the questionnaire to fill out and take in with them to their appointment. The provider then recommended a CRC screening method based on the patient's answers to the questionnaire. Literature demonstrates that reminding the provider to screen will increase the likelihood that they will have a discussion with patients about CRC screening. In turn, by having a discussion with patients and recommending a screening method, patients will be more inclined to participate in screening. Since a paper reminder is concrete and the patient handed it to the doctor at their appointment, it was hard to overlook.

Summary

After completing an extensive literature review, evidence supports the use of a provider reminder system, multiple screening methods, provider recommendation, and patient education to increase CRC screening uptake. The United States Department of Health and Human Services' (USDHHS, n.d.) Healthy People 2020 Initiative established three objectives for colorectal cancer, including reducing CRC death rate, reducing the incidence of invasive CRC, and increasing the number of adults who participate in CRC screening. The goal for the Healthy People 2020 Initiative is to increase the proportion of adults who receive CRC screening from 52.1% in 2008 to 70.5% in 2020 (USDHHS, n.d.). By focusing on increasing screening, all three

objectives could be met. Fortunately, current methods of screening are very reliable in finding colorectal malignancies. Literature shows that CRC is very treatable when detected in the early stages and that the prognosis is typically good if found early. Finding and treating CRC in the early stages would decrease the death rate. By reminding providers to recommend screening and educating patients about the importance of screening, more adults would be inclined to participate.

The project goal aligns with the Triple Aim objectives of improving the patient experience of care, improving the health of the population, and reducing the per capita cost of health care (Institute of Healthcare Improvement (IHI), 2020). By assessing the patient's need for CRC screening, the provider is ensuring comprehensive care which improves patient experience and the health of the population as a whole. According to Rex et al. (2017), screening for CRC with any screening modality has been consistently proven to be more cost-effective than no screening at all.

Chapter Three: Theory and Concept Model for Evidence-based Practice

Evidence-based practice (EBP) emphasizes the combination of research, clinical expertise, and patient preference when making clinical decisions (Butts & Rich, 2018). Utilizing EBP enables the provider to deliver care to patients that is safe and effective. The use of nursing theory and practice change models assist the practitioner in developing an EBP project that improves the quality of care. This chapter will discuss and define the major concepts of the quality improvement (QI) project. It will then examine the Health Belief Model and its application to the project. Lastly, it will describe the Institute for Healthcare Improvement's (IHI) Model for Improvement and its utilization in the development of this project.

Concept Analysis

When developing a project to increase colorectal cancer screening referrals in a primary care facility, many concepts need to be considered. The major concepts included in the project were health promotion, health behavior, and clinical care standards.

Health promotion. Health promotion refers to activities that improve the physical well-being and health status of individuals and society (Duplaga, Grysztar, Rodzinka & Kopec, 2016). It is the prevention of disease and the incorporation of healthy life choices to ensure wellbeing and happiness into everyday life (Duplaga et al., 2016). Various programs and public health organizations focus on emphasizing health promotion activities, including weight loss, smoking cessation, and cancer screening. By focusing on healthy lifestyle choices and methods to prevent disease and disability, the goal of health promotion is to achieve wellness and increase the quality of life (Duplaga et al., 2016). Disease prevention is a large part of health promotion, as avoiding or eliminating disease leads to improvement of health (Duplaga et al. 2016). Cancer screening has proven to be an effective method in detecting disease in its early stages and

preventing progression. The purpose of the project was to increase provider CRC referrals rates which, in turn, would improve CRC screening rates at the primary care office.

Health behavior. Health behavior is the way an individual approaches his or her health maintenance, restoration, and improvement based on personal beliefs, motives, and perceptions (Butts & Rich, 2018). Health behaviors are the actions, intentional or unintentional, that affect personal health and mortality (Short & Mollborn, 2015). These actions can help or harm the health of the individual (Short & Mollborn, 2015). Examples of health behavior include smoking, exercise, adherence to medical treatment, and participating in health screenings (Short & Mollborn, 2015). Health behavior has been studied extensively in an effort to explain why people do or do not participate in certain actions to maintain good health and prevent illnesses (Butts & Rich, 2018). The project intended to positively influence the health behavior of individuals by providing education and the opportunity to participate in CRC screening. The provider recommended CRC screening to those who were due, which literature proves increases CRC screening compliance among patients (Peterson et al., 2016).

Clinical care standards. Clinical standards and practice guidelines are developed to support best practice and provide evidence-based guidance to optimize patient care. Clinical standards are quality statements that "aim to ensure that all patients with the same clinical condition are offered appropriate care, regardless of their location" (Chew, Herkes, & Page, 2016, p. S8). Clinical standards are put in place so unwarranted variations are reduced (Chew et al., 2016). These standards are, in essence, what providers across the nation are expected to do to deliver safe, evidence-based, and comprehensive care to patients. Offering and encouraging CRC screening to patients ages 50-75 is the current USPSTF recommendation (Bibbins-Domingo et al., 2016). Although this is evidence-based and screening is proven to detect CRC

in its early stages, providers do not always adhere to this, which leads to a gap in knowledge. This project used a patient questionnaire as a provider reminder to discuss and recommend screening to the appropriate patients in efforts to increase CRC screening at the primary care clinic.

Theoretical Framework

Health Belief Model. Health behavior theories were developed in an attempt to explain why some people participate in certain health behaviors while others do not, and what influences some to change their unhealthy habits to healthy ones (Noar, Chabot & Zimmerman, 2008). According to Butts and Rich (2018), there is not one single health behavior theory that dominates the others in current practice, but the three most commonly used today are the transtheoretical model, social cognitive theory (SCT), and the health belief model (HBM). Although these theories have differences among them, they are all similar in the fact that each one's ultimate goal is to identify factors that will influence health behavior change (Noar et al., 2008).

The HBM provided the theoretical framework for the QI project, as it is often used to guide health promotion and disease prevention programs (Yoo, Kwon, & Pfeiffer, 2013). In the 1950s, the creation of the HBM was sparked by the lack of interest and participation in preventative health programs, even if they were free and readily available (Butts & Rich, 2018). A group of social psychologists involved in public health sought out to explain why so many people failed to participate in disease prevention programs (Butts & Rich, 2018). By focusing on attitudes and beliefs of individuals, the HBM attempts to explain and predict health behaviors (Yoo et al., 2013). The foundation of the HBM is based on four main concepts: perceived susceptibility, perceived severity, perceived benefits, and perceived barriers (Yoo et al., 2013).

Perceived susceptibility is the idea that people are more likely to take preventative action or act in healthier ways if they believe they are susceptible to a particular health risk (Carpenter, 2010). If people believe that an adverse health outcome is unlikely to affect them, they will not go out of their way to prevent it (Carpenter, 2010). Perceived severity refers to the belief that if a health condition could lead to a serious negative outcome, such as physical injury, pain, mental impairment, or death, then a person will be more likely to take action to prevent that outcome (Yoo et al., 2013). If the potential health condition would not have much effect on a person's life, then they are less likely to take measures to avoid it (Carpenter, 2010). Perceived benefit is the idea that if a person believes an action or behavior will lead to positive benefits, or will reduce his or her susceptibility and severity of the condition, he or she will be more likely to participate in that action (Yoo et al., 2013). Lastly, perceived barriers refer to the idea that if a person thinks an action has too many barriers, such as high cost, pain, or timely procedures, he or she is less likely to participate even if they think it may be beneficial (Carpenter, 2010).

Butts and Rich (2018) also discuss cue to action as a component of the HBM. Cue to action refers to the exposure of external factors, like patient education or provider recommendation, that may motivate a person to change their health behavior (Butts & Rich, 2018).

Application to practice change. The HBM is a useful guide for providers when developing programs that focus on health promotion and behavior change, where education regarding susceptibility, severity, benefits, and barriers is beneficial (Butts & Rich, 2018). The interventions for the project address each component of the HBM.

If a person does not have a family history of CRC, they may not participate in screening because they do not think they are at risk. However, all average risk individuals ages 50-75

years old should be routinely screened for CRC. Perceived susceptibility was addressed by providing patient education about CRC, risk factors, and national screening recommendations. Perceived severity and perceived benefit were also addressed by providing patient education. If a person believes that CRC may result in death, he or she will be more likely to participate in screening. Because CRC has a poor prognosis once it has progressed, screening to detect the cancer in its early stages must be emphasized to each patient. If a person believes CRC screening is useful and effective in detecting CRC, they are more likely to get screened. By educating patients regarding the accuracy and sensitivity of both colonoscopy and Cologuard, the benefits of screening were highlighted. Perceived barriers were addressed by offering two different screening methods. By offering Cologuard, an easy stool-based test, the inconvenience of having a procedure was eliminated.

Yoo et al. (2013) found that perceived CRC threat and perceived screening benefits were key factors for compliance in taking a stool-based test. They also found that the most significant barriers in participating in screening was the lack of knowledge about CRC and screening modalities (Yoo et al., 2013). All of the interventions utilized in the project served as cues to action for the patients and the providers. These strategies activated readiness by promoting awareness through the educational brochure. The questionnaire reminded the providers to offer CRC screening and discuss any concerns that the patients may have.

EBP Change Theory

Model for Improvement. This quality improvement (QI) project was conducted following the IHI Model for Improvement. This model focuses on three key questions: 1) What are we trying to accomplish? 2) How will we know that a change is an improvement? 3) What changes can we make that will result in improvement? (Moran, Burson, & Conrad, 2017). By

asking these questions and establishing the change needed at the organization, it was then continuously tested using the Plan-Do-Study-Act (PDSA) cycle (Moran et al., 2017). The PDSA cycle is when a change is planned (plan), implemented (do), analyzed (study), and then revised based on the results (act). The first stage, plan, is where the three key questions previously mentioned were addressed. This allowed for objectives to be set based on the clinic's needs (Donnelly & Kirk, 2015). The second stage is do, which is where changes were implemented by using the interventions established in the plan stage. During this stage, data was recorded and observations, problems, or changes were documented (Donnelly & Kirk, 2015). The third step is study. In this stage, the data and process were analyzed using key questions: 1) Was the outcome close to what was anticipated? 2) Did the project work out as intended? 3) What lessons were learned? (Donnelly & Kirk, 2015). Lastly, act is drawing conclusions from project implementation and making modifications so the project can continue to be carried out effectively (Donnelly & Kirk, 2015). This last step generated a plan for the next PDSA cycle (Donnelly & Kirk, 2015). There were several PDSA cycles in the QI project, as evaluation and modification were necessary to improve interventions (Moran et al., 2017).

Application to practice change. The Model for Improvement and PDSA cycle was utilized for this QI project's change process. The three key questions of the Model for Improvement were used in the plan stage of the project when developing the question-guided inquiry (PICO). It was determined that the goal of the project was to increase provider CRC screening referrals in a primary care clinic by establishing a standardized approach for CRC screening. The changes made in the practice included educating patients and establishing provider reminders for CRC screening.

The PDSA cycle was continually used throughout project implementation. The logistics of distributing education brochures and questionnaires was evaluated and changed as needed to ensure compliance. Feedback was obtained from the clerical staff, and concerns were addressed. There was routine follow up with the providers regarding barriers with the questionnaire or any other concerns. Ongoing evaluation of the project interventions was conducted and recorded throughout the implementation phase. Once the implementation phase of the project was over, strengths, limitations, and barriers of the practice initiative were recorded and analyzed. Significance related to future clinical practice was identified, and changes were made to ensure improvements were sustainable.

Summary

The overall goal of the QI project was to increase provider referral for colorectal screening. The major concepts surrounding this outcome were health promotion, health behavior, and clinical care standards. The concept of health promotion was explored in relation to CRC screening participation. Health behavior was discussed to incorporate patient perspective and address the role of patient education in influencing this behavior. Lastly, clinical care standards were defined to reiterate the problem and highlight the need for a provider-directed intervention at the clinical site.

The Health Belief Model is commonly used to guide health promotion interventions, as the model focuses on predicting what causes behavior change in individuals. This model served as the project's framework because the emphasis of the project was health promotion and disease prevention. By examining patients' perceived susceptibility, severity, benefit, and barriers, interventions were tailored toward addressing these components. Furthermore, the project's

evidence-based interventions served as cues to action in motivating patients to participate in screening.

The IHI Model for Improvement and the PDSA cycle were used throughout the implementation and analysis of the project. The Model for Improvement supported the project's change process and assisted in improving the clinic's process for colorectal cancer screening.

Chapter Four: Pre-implementation Plan

Before project implementation, it is necessary to discuss the pre-implementation plan in order to minimize barriers in the implementation phase. This chapter will address the purpose of the project and review its project management aspects, including organizational readiness for change, interprofessional collaboration, risk management assessment, and the organizational approval process. A cost analysis, the Institutional Review Board (IRB) approval process, and a plan for project evaluation will also be discussed in this chapter.

Project Purpose

The purpose of the project was to increase provider referrals for CRC screening to patients aged 50-75 years old. There is evidence that provider recommendations increase CRC screening uptake in patients (Peterson et al., 2016). A CRC screening questionnaire was completed by appropriate patients and then given to the provider during the office visit. This questionnaire not only determined which screening modality was most appropriate, but also served as a reminder to the provider to refer the patient for screening.

Project Management

Organizational readiness for change. Organizational readiness for change is a critical component for quality improvement projects. The providers at this practice acknowledged the importance of CRC screening and admitted that their practice could have a better process in place for ensuring all appropriate patients were screened. The providers and staff members were receptive to incorporating a screening questionnaire for patients to identify and refer those who had not recently been screened for CRC. The staff was provided with education about CRC screening guidelines, so they had a better understanding of the significance of routine screening for early detection of CRC (See Appendix E).

Interprofessional collaboration. To implement a successful QI project, interdisciplinary collaboration is vital. This DNP project included a DNP student, DNP faculty, two office secretaries, a medical office assistant (MOA), and three providers, one of which served as the site champion. The site champion and DNP faculty aided in project planning and offered recommendations for project improvement and logistics with implementation. The secretaries and MOA shared the responsibility of distributing the questionnaire to the appropriate patients at check-in. All three providers participated in discussing CRC screening with their patients and referred them for colonoscopy or Cologuard. The DNP student collected data regarding how many patients aged 50 to 75 years old came into the clinic bi-weekly versus how many completed the questionnaire.

Risk management assessment. To evaluate barriers and potential changes needed during implementation, a SWOT (Strengths, Weaknesses, Opportunities, and Threats) Analysis was completed. A major strength of this project was that the project site was small and privately owned, which made project approval and communication with the site champion easily accessible. Other strengths included ease of the questionnaire, minimal cost, and ample staff buy-in.

A weakness of this clinic site was that it did not have a standardized way to implement CRC cancer screening. Their EMR system was dated and not user-friendly, so adding screening to the EMR was not an option. The practice recognized this weakness and agreed to participate in this project to establish a better system for screening.

Opportunities included establishing a standardized method to remind providers to refer their patients for CRC screening. In an office that expressed concern about their assessment and referral of CRC screening, an opportunity for improvement was emphasized. The questionnaire

was easy to implement and could be easily sustained for future practice if the providers saw positive results.

The main threat to the success of this project was the potential issue with staff noncompliance with distributing the questionnaire to the appropriate patients. Although the staff agreed to participate in the implementation of this project, forgetting to distribute questionnaires to the appropriate patients was possible and would result in failure of provider referral for screening.

Organizational approval process. Approval for this project began with the DNP student discussing clinic site needs with the head physician at the office. The provider expressed concern with routine health screenings, specifically CRC screening. The DNP student and the provider discussed creating a questionnaire that would allow the provider to easily differentiate which patients would qualify for Cologuard screening, and which patients would need to be referred for a colonoscopy. The DNP student then performed a literature review and created a questionnaire that the provider approved to be utilized in the office. This questionnaire did not only show the providers who were eligible for Cologuard referral, but also reminded them to recommend CRC screening to their patients. The final project plan was created and approval was obtained by the site champion and faculty to proceed with project implementation at this clinic (see Appendix F).

Information technology. Microsoft Word was used in the creation of the CRC screening questionnaire and the data collection tool that was utilized in the project. Microsoft PowerPoint was used to create staff education about CRC screening and the QI project implemented at the office. The data gathered from the data collection tool was entered into Microsoft Excel bi-weekly by the DNP student. The providers entered CRC screening referrals

into E-Clinical, the office electronic health record (EHR), but this was not accessed by the DNP student and was therefore not utilized in this project.

Cost Analysis of Materials Needed for Project

The cost of this project was minimal, and primarily included printing the CRC questionnaires, patient education pamphlet, data collection tool, and staff education handouts. The DNP student created and printed the paper materials, so no cost was incurred by the project site. There was also a folder provided by the DNP student to keep completed questionnaires in for the student to pick up. Breakfast was provided during the staff education session prior to implementation, and snacks were frequently brought to the staff during implementation. The total cost of this DNP project was $47.69 (see Appendix G).

Plans for Institutional Review Board Approval

The project implementation site did not have its own IRB. East Carolina University IRB review process was initiated by obtaining faculty approval of the project and completing CITI training modules. DNP faculty reviewed project tools and approved the project to be submitted for IRB review. This project was considered a QI project, so IRB approval was not required (see Appendix I).

Plan for Project Evaluation

Demographics. The patients involved in this project are all aged 50-75 years old. Additional demographic information was not collected, as the purpose of the QI project was to increase provider referrals of CRC screening to average-risk individuals. Demographic information regarding the staff at the project site was not collected.

Outcome measurement. The project's primary outcome was to increase provider CRC screening referral rates in a primary care clinic by incorporating a provider reminder by

implementing a standardized approach to assessing patients' screening status. A process measure used for this practice to evaluate the effectiveness of the provider reminder system was the completed questionnaires by both the patient and the provider. A potential patient outcome that was not measured was the effect of patient education on increased compliance in CRC screening.

Evaluation tool. There were two evaluation tools used for this project. The first evaluation tool was the CRC screening questionnaire that included a section for the provider to select which CRC screening method the patient was referred for. The questionnaire was utilized to track provider referrals. Providers marked "colonoscopy", "Cologuard", "patient refused", or "patient up to date" (See Appendices B and C).

The second evaluation tool was a patient screening record used to track staff compliance in giving the questionnaire to all patients aged 50-75 years old (See Appendix H). The DNP student was responsible for tracking how many patients aged 50 to 75 years old came into the clinic bi-weekly based on office records. The student was also able to use the dated questionnaires to establish how many eligible patients received the questionnaire in that time frame. The DNP student created both tools, and they were approved by the DNP faculty and the site champion.

Data analysis. Provider referrals were analyzed using Microsoft Excel. Provider referral data was quantitative and at the nominal level. Data displayed how many people were referred for colonoscopy, how many were referred for Cologuard, how many refused, and how many had already been screened. The DNP student was not able to compare pre-intervention referral rates to post-intervention referral rates due to lack of pre-intervention records. To be in accordance

with USDHHS (n.d.), 70.5% of adults 50 to 75 years old would have participated in CRC screening. Percentages were calculated and displayed using a bar graph.

Staff compliance was also analyzed using Microsoft Excel, and the data was quantitative at the nominal level. The data displayed how many eligible patients came into the clinic every day versus how many questionnaires were distributed to appropriate patients. This data was important in that it identified factors that may have contributed to increased or decreased referral rates. There were no benchmarks available for comparison. Percentages were calculated and displayed using a chart.

Data management. There were no personal patient identifiers collected during this project, so collection and storage of the questionnaires was simple. Each completed questionnaire was put in a folder at the secretary's desk and picked up by the DNP student bi-weekly. The patient screening record was completed at the office by the student bi-weekly, then taken home to analyze. The two secretaries, MOA, three providers, and the DNP student had access to these tools throughout implementation. Data collected were entered into a password protected computer via Microsoft Excel. At the end of the project, all paper materials were shredded and electronic records were deleted.

Summary

The DNP project included an ample amount of planning before implementation. Identifying the purpose of the project guided the DNP student in making adjustments to ensure the goal was continually being assessed and worked toward. During pre-implementation, the site's organizational readiness, interprofessional collaboration, risk management assessment, and organizational approval were essential to evaluate in order to identify any confusion or barriers before implementation began.

Analyzing and estimating the cost of project implementation was important to ensure feasibility for the site and the DNP student. IRB review was required to confirm that the project was quality improvement and not human research. Lastly, constructing a plan for data collection, outcome measurement, evaluation tools to be used, and data analysis was vital to do before implementation so the DNP student would be prepared to make any necessary adjustments.

Chapter Five: Implementation Process

This chapter discusses the implementation process of the DNP QI project within a primary care clinic in suburban North Carolina. This project took place over a twelve-week period, from August 2019 to November 2019. In this chapter, the project setting, participants, and how the DNP student recruited this clinic and its staff will be discussed. Plan variation that the DNP student experienced during execution of the project will be examined, as well as the application of the PDSA cycle in order to overcome barriers and unforeseen variations during project implementation.

Setting

This project took place at a family practice clinic in a suburban area of Charlotte, NC. The practice is a small, privately owned clinic with no affiliation to a healthcare system. There are three providers at the clinic, two physicians and one physician's assistant. The office sees an average of 125 patients per week. The clinic accepts private insurance and Medicare, but does not accept Medicaid. According to the project site champion, the majority of health conditions treated in this clinic are diabetes, asthma, COPD, cardiovascular disease, kidney disease, substance abuse, and anemia (Personal communication, February 4, 2019). Their interest in this project lies on the opportunity to improve routine CRC screening for the patients who are eligible.

Participants

The provider who owns the clinic served as the site champion and worked closely with the DNP student in creating the QI project. An assessment of the office's strengths and weaknesses was made with the site champion, and it was decided that a project regarding routine cancer screening would be beneficial for this clinic. All three of the clinic's providers were

involved in recommending and referring patients for CRC screening. The providers reviewed the patient's CRC questionnaire, discussed evidence-based guidelines and screening options with the patients, and completed the section for providers on the questionnaire. The providers then entered the referral into the EHR themselves. The secretary and MOA were responsible for distributing the CRC questionnaire to the appropriate patients and ensuring its completion. They were also responsible for collecting the completed questionnaires and placing them in a folder for the DNP student to pick up. All patients aged 50 to 75 years old who were seen at the clinic during implementation were eligible to complete the CRC questionnaire. However, if a patient was seen more than once during the twelve-week implementation phase, only one questionnaire was completed. Patients who did not fall in the stated age range or those who refused to complete the questionnaire were the only participants excluded from this project.

Recruitment

The participants in the office were made aware of this project during the DNP student's clinical rotation in the fall of 2018. There were informal discussions with the providers and the site champion concerning quality improvement projects needed in the clinic. The DNP student discussed project implementation plans with the entire staff when the letter of support and contract from the project lead were collected. All staff members at the clinic were expected to participate in the project. The DNP student perceived the staff to be willing participants and did not sense reluctance or discontentment. The DNP student, or project lead, scheduled an educational session by email with the site champion, then communicated details with the secretary via phone conversation. The secretary ensured all staff at the office was aware of the education session. During the education session, a brief PowerPoint handout was given to the staff, along with the CRC questionnaire and the CRC education pamphlet. The staff was

educated about CRC screening guidelines and its importance, and then the project was described in detail. The DNP student discussed the role of each participant and answered all questions and concerns to ensure success of project implementation. The DNP student also reviewed the questionnaire and the education pamphlet with the staff to confirm that each member of the team understood and agreed with what the patients would be receiving.

Implementation Process

During the pre-implementation phase of this project, the DNP student created English and Spanish CRC questionnaires, the data collection tool, and the staff education PowerPoint. The questions used for the questionnaire were based on Cologuard exclusion criteria. The patient education pamphlet was found on the CDC website and copies were printed. The twelve-week implementation plan took place from August 20, 2019 to November 8, 2019. An educational breakfast session was held for all staff prior to project implementation. During this session, project details and goals were clearly articulated and questions and concerns were addressed.

The secretary and MOA were responsible for distributing the questionnaire and CRC education pamphlet to all patients between 50 and 75 years old upon check-in at the clinic. The patients were asked to complete the questionnaire during their wait in the lounge or in the patient room. The providers were responsible for reviewing the questionnaire and answering any questions the patients had about CRC screening. The providers were then accountable for entering the patient referral for Cologuard screening or colonoscopy into the EHR if he or she was due. The section for the provider at the bottom of the questionnaire indicated what screening method the provider recommended, or if the patient refused. The provider then gave the completed questionnaire to the secretary for her to place in a folder for the DNP student to

collect. The DNP student visited the office every other week to collect the questionnaires and record how many patients ages 50-75 years old came in for appointments the prior two weeks. The student then compared the number of eligible patients who came into the office versus the number of completed questionnaires, and recorded that number on the data collection tool.

The DNP student entered data bi-weekly into Microsoft Excel to keep track of progress and trends. If the number of patients being screened decreased substantially, the DNP student discussed barriers with the staff and made changes. By identifying barriers early, there was an opportunity to make changes as necessary to ensure success of project implementation. If implementation was successful, the number of appropriate patients who entered the clinic each day would closely match the number of questionnaires completed. If the project was a success, the providers portion of the questionnaire would be completed on a large percentage of the questionnaires turned in. This would indicate that the provider had a discussion with each patient about screening, thus referring the patient when appropriate.

Plan Variation

Throughout project implementation, staff compliance with distributing CRC questionnaires was inconsistent. In the second week, it became evident that the staff secretary was not able to remember to hand out the questionnaires upon patient check in. It was decided that the MOA would take responsibility distributing the questionnaires when she took patients to their room. Compliance increased for a week, but then decreased again because the MOA was unexpectedly out of office, and then forgot when she was back the next week. When it was evident that compliance remained low in the following weeks, changes were made. Instead of keeping the questionnaires at the MOA's desk, they were kept under her blood pressure cuff so

she would remember to take them into the room with her. Compliance drastically increased the last three weeks of implementation after this change.

Summary

This chapter provided an overview of the project setting, participants, recruitment process, implementation steps, and plan variation related to this project. The implementation process was described in detail so that other professionals would be able to replicate this project if desired. Through bi-weekly site visits and PDSA cycles, barriers were identified that led to the plan variations discussed above. Project findings will be discussed in the following chapter.

Chapter Six: Evaluation of the Practice Change Initiative

After the implementation phase, data collected was organized and analyzed to determine whether project goals and outcomes were achieved. The impact of using the CRC questionnaire as a provider reminder to screen was examined. Project findings will be discussed in this chapter.

Participant Demographics

There were a total of five participants present in this project, including one secretary, one MOA, and three providers. All three providers were male, and the secretary and MOA were female. The project was conducted at a primary care office in a suburban area of Charlotte, NC. Specific demographic data regarding the project participants were not collected as it was not relevant to the project goals or outcome.

A total of 62 patients received the CRC screening questionnaire during the implementation period. These patients were male and female, all ages 50-75 years old. Specific demographic information was not collected in order to ensure patient confidentiality. The purpose of the project was to increase provider referrals of CRC screening to average-risk individuals, so demographic data of participants were not relevant for the project.

Intended Outcome(s)

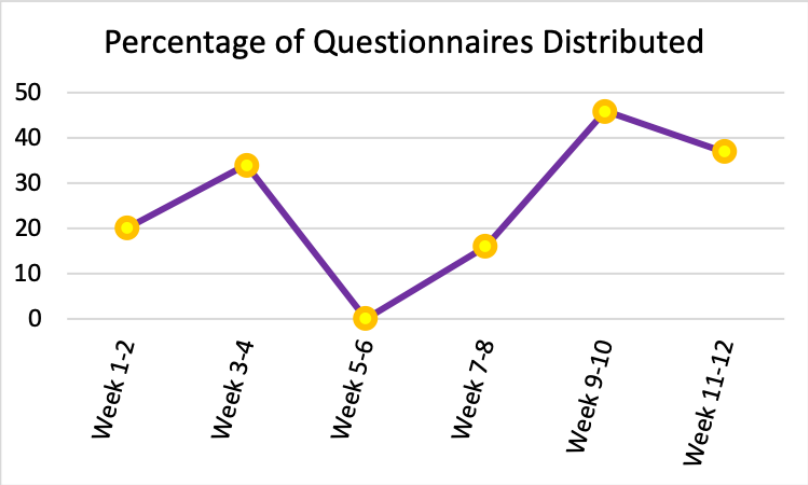
Prior to project implementation, the providers at the primary care clinic voiced concern about the lack of protocol for CRC screening in the office. An education session was provided to all staff about the importance of routinely screening eligible patients for CRC. The short and intermediate intended outcome for this was to create buy in from the staff that would motivate them to participate in a standardized approach to screening in the office. The long-term intended

outcome was to create a sustainable method to ensure all patients aged 50-75 years old are being educated and offered CRC screening.

A short-term intended outcome was to have staff distribute the questionnaires to all patients 50-75 years old, as the questionnaire's purpose was to remind physicians to refer appropriate patients for CRC screening. Consequently, a short and intermediate intended outcome was for the providers to use the questionnaire as a reminder and decision-making tool for CRC referral. The primary long term intended outcome for this project was to increase provider CRC screening referral rates at the project site. This would, in turn, increase the number of patients who are being screened for CRC at the primary care clinic. These outcomes relate to the NCCRT's nationwide initiative to increase CRC rates to 80% in every community, as well as USPSTF recommendation for all patients aged 50-75 years old to participate in any type of CRC screening (Dougherty et al., 2018; Bibbins-Domingo et al., 2016).

Findings. A total of 244 patients between the ages of 50-75 years visited the clinic and were eligible to receive a questionnaire. Of the 244 eligible patients, 62 (25%) of them received a questionnaire. The questionnaire was not given to 182 (75%) of the eligible patients due to barriers with remembering to distribute the questionnaires (See Appendix J).

The graph below shows the variation of screening rates throughout the twelve-week implementation phase. Compliance rates were combined into biweekly rates that illustrate the upward and downward trends in staff compliance (See Graph 1). Overall staff compliance rate of distributing questionnaires were 25%.

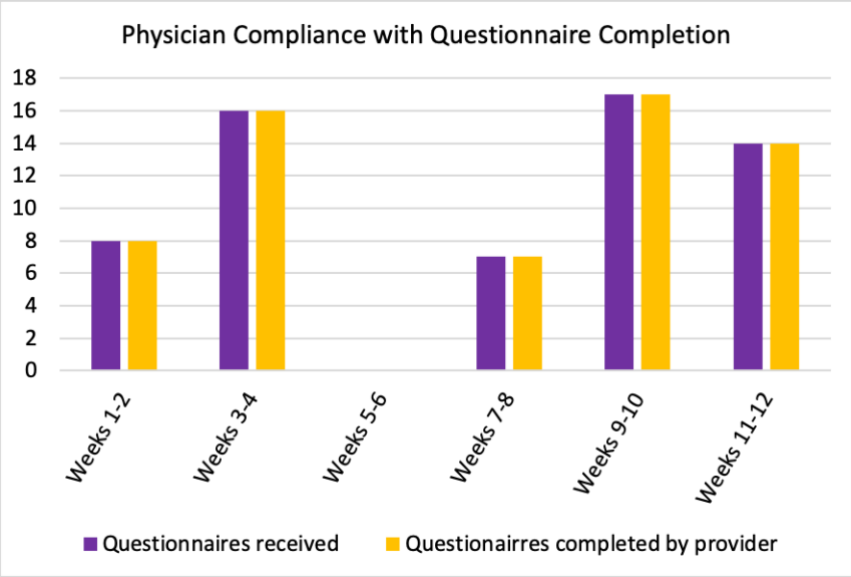


Graph 1. Staff compliance with CRC questionnaire distribution

Staff compliance started out a little weak in the beginning, as the project was new to them and they were getting use to remembering to distribute questionnaires to the correct patient population. After the first two weeks, staff compliance with distributing questionnaires was at 20%. The DNP student visited the project site after week two and assessed barriers with the staff. The secretary was responsible for giving patients the questionnaires at patient check in; however, she had multiple responsibilities and voiced concern about not being able to remember to do this. At this point, the MOA offered to hand out the questionnaires when bringing patients to their rooms. There was a 14% increase in distribution compliance in weeks three and four, bringing overall compliance to 34%. However, there was a drastic decrease to 0% compliance in weeks five and six. During this time period, the MOA was out of work for a week due to a family issue and there was not an established back up plan for questionnaire distribution. The DNP student brought cookies to the clinic after week six and reminded the staff of the questionnaire distribution. After only a slight improvement during weeks seven and eight, the student discussed ways to increase compliance with the staff. It was decided that the questionnaires would be relocated to be better seen by the MOA. After this intervention, there

was a 30% increase in questionnaire distribution in week nine. During weeks nine through ten and eleven through twelve, marked improvement in questionnaire distribution was noted, at 46% and 37% respectively.

The graph below depicts provider compliance biweekly with questionnaire completion. Although there was only 25% compliance with distributing the questionnaires, there were 100% compliance by the providers in completing the questionnaires they received.



Graph 2. Physician compliance with questionnaire completion

Of the 62 patients assessed for CRC screening, 43 (69%) were up to date, 17 (27%) were referred for screening, and two (3%) refused screening. Throughout the twelve weeks, ten patients were referred for Cologuard screening, and seven were referred for colonoscopy.

Summary

The project yielded a total of 17 patient referrals for CRC screening by colonoscopy or Cologuard. Because there were no pre-intervention comparison data available, the project's goal was to implement a provider reminder system via a standardized approach for CRC screening to

improve practice. The main barrier identified was staff compliance in using the reminder tool. From the project findings, when the questionnaire was used, the providers were 100% compliant in referring appropriate patients for screening.

Chapter Seven: Implications for Nursing Practice

The American Association of College of Nursing (AACN) (2006) established eight essentials that must be met by all DNP program graduates in order to be prepared for an advanced nursing practice role. Each essential discusses core competencies that are vital to the doctoral prepared nurse practitioner. This chapter will examine all eight essentials and demonstrate how they are utilized in this quality improvement project.

Practice Implications

Essential I: Scientific underpinnings for practice. The first DNP essential focuses on the ability to analyze and address current and future practice issues by performing extensive literature reviews and translating this research into practice (AACN, 2006). By integrating research, theory, and practice, the DNP student created a QI project that focused on improving current practice and patient outcomes (AACN, 2006). An extensive literature review was performed for this project and highlighted the detrimental effects of CRC and the importance of routine preventative screening. There are updated guidelines that incorporate new, simpler, and more cost-effective methods for screening. Evidence-based methods have been proven to increase CRC screening in primary care offices, including a provider reminder system, patient education, and a provider recommendation for screening. Using this research, the DNP student was able to translate this knowledge into a QI project in efforts to increase CRC screening at a primary care office. A questionnaire was used as the provider reminder to recommend CRC screening to the appropriate patients. Patients were also given a CRC screening pamphlet so they were educated on the latest CRC screening methods.

This project was guided by application of the Health Belief Model as the theoretical framework in which the DNP student based the project's interventions on. By utilizing the

IHI's Model for Improvement and the PDSA cycle, the project was able to be continuously evaluated and improved. A recommendation for future practice would be that the office have an established method of routinely referring patients for CRC screening.

Essential II: Organization and systems leadership for quality improvement and systems thinking. The second essential discusses the DNP student's ability to critically think and use leadership skills to ensure patient safety, improve the quality of care, and impact healthcare reform (AACN, 2006). Acquiring these skills will aid the advanced practitioner in developing strategies to manage ethical dilemmas, eliminate health disparities, and monitor costs and budgets appropriately (AACN, 2006). The doctoral prepared provider must serve as an advocate for change when standards of care are not being met.

Research demonstrates that not enough people are being routinely screened for CRC. In the initial phase of this project, it was evident that the primary care office did not have a process in place for ensuring all patients were routinely screened for CRC. Consequently, the providers would forget to recommend screening and the appropriate patients were not being referred. The development of this QI project focused on evidence-based research and national guidelines. The DNP student implemented a brief patient questionnaire to serve as a provider reminder to refer patients for CRC screening. The intervention employed was cost effective and would be able to be easily continued in the future. Furthermore, because of the known barriers of getting a colonoscopy, the providers offered their patients a stool-based test as an option for screening. This addressed logistical and economical concerns, while still focusing on what is best for the patient. A recommendation for future practice would be to allow the patient to choose whatever method he or she is most likely to do. Whether the barrier is time, transportation, cost, or other reasons, the best screening method is that one that gets done.

Essential III: Clinical scholarship and analytical methods for EBP. The AACN (2006) states that "scholarship and research are the hallmarks of doctoral education" (p. 12). The third essential emphasizes the importance of the DNP graduate to analyze and evaluate literature to determine best practices (AACN, 2006). The doctoral prepared practitioner will not only be able to disseminate research findings, but will also be able to create and implement quality improvement projects that focus on patient care (AACN, 2006).

Through research and data analysis, the DNP student identified multiple evidence-based strategies that are shown to increase CRC screening in a primary care setting. This QI project provided the opportunity to increase CRC screening in a clinical setting where CRC screening efforts needed improvement. By evaluating literature, the DNP student found that the new stool based test Cologuard was an effective screening option to offer those who did not want to participate in colonoscopy screening. By collaborating with interdisciplinary teams, the implementation of this project aims to promote health and increase quality of care by utilizing preventative screening measures. Upon project completion, the findings will be analyzed and disseminated to assist in recognizing gaps in care and work towards the improvement of cancer screening.

Essential IV: Information systems/technology and patient care technology for the improvement and transformation of healthcare. The fourth essential highlights the importance of the DNP graduate's ability to use information systems and technology to evaluate, analyze, and improve the quality of care provided to patients (AACN, 2006). The doctoral prepared Nurse Practitioner is able to assess and determine the efficacy of patient care technology and its use in the appropriate setting (AACN, 2006). The use of technology was instrumental in the implementation and analysis phase of the QI project. Microsoft Word was

used to develop the CRC questionnaire and data collection tool, as well as for the creation of the operational and tracking tools. Microsoft Excel was used to securely store the collected data.

The EMR at the project implementation site was limited in its ability to add electronic screening tools and reminders. Although limited, the providers were able to use the EMR to enter in the correct CRC screening referral. They expressed their frustration and desire to be able to use technology systems for provider reminders and screening tools. Collecting this information electronically would ensure that it stays in the patient's permanent record, and could also be used to alert the provider that the patient is due for a particular screening. These technological advances would increase work flow, reduce redundancy, and ensure compliance with recommended guidelines. A recommendation for future practice would be for this clinic to invest in a new EMR system that can provide reminders for appropriate preventative screenings.

Essential V: Healthcare policy for advocacy in healthcare. Healthcare policies are put into place to influence the delivery of care, including quality of care, health disparities, safety, access to care, financing, and ethics (AACN, 2006). These policies can be created on a local, federal, institutional, or organizational level (AACN, 2006). It is the expectation that the DNP graduate will engage in policy development and commit to advocating for policies that change the healthcare system for the better (AACN, 2006).

Although there are national policies and health care standards in place, it is not always guaranteed that every clinic adheres to these guidelines. The DNP student found that it is imperative that mandatory policies are set in place at an organizational level so important preventative care measures, such as CRC screening, are not forgotten about. The QI project also identified barriers to access to care and quality of care that could be influenced if state and federal health care policies were adhered to on a regular basis. For example, not having a

practice in place for reminding providers to address CRC screening results in patients not being given the appropriate information and opportunity to participate in screening. It is critical that advanced practice providers advocate for patients by participating on committees that develop and influence health care policy.

Essential VI: Interprofessional collaboration for improving patient and population health outcomes. Interprofessional collaboration is the foundation for delivering quality health care. The doctoral prepared advanced practitioner is prepared to work with a variety of members of the health care team, including physicians, dieticians, occupational therapy, physical therapy, nurses, medical assistants, and pharmacists (AACN, 2006). In order to ensure safe, effective, and efficient care, healthcare professionals must communicate effectively and use their individual skills to improve policies and facilitate change (AACN, 2006).

The implementation of the QI project involved collaboration with multiple healthcare professionals. The DNP student planned and led the QI project, while the medical assistant and secretary were critical in the implementation and execution of distributing questionnaires to the appropriate patients. The providers brought everything together by educating the patients and entering in the correct CRC screening referral. Each discipline played an important role in the enactment of this project. A recommendation for future practice would be for each member of the team to communicate with the others when he or she is unable to complete their part of the project. If the medical assistant was absent one day, there should be a protocol in place that the secretary would then distribute the questionnaires. This would ensure that all appropriate patients are being screened every day in this clinic as a standard of practice.

Essential VII: Clinical prevention and population health for improving the nation's health. Health promotion and disease prevention is the cornerstone for primary care. The

seventh essential focuses on the ability of the DNP graduate to gather and synthesize evidence-based data in order to develop strategies for change (AACN, 2006). These strategies will address health disparities, diversity, and gaps in care and will lead to improved healthcare processes and delivery (AACN, 2006).

The DNP student was able to analyze data that led to the development of a QI project that focused on disease prevention and health promotion. Project findings included evidence-based interventions that are shown to improve CRC screening in a primary care setting. Improving CRC screening methods will positively influence the health of this population by improving the number of patients screened. Future recommendations include patient education regarding health promotion activities and national standards for disease prevention. Additionally, provider education of the critical role they play in influencing patients by encouraging and recommending health screenings is equally important.

Essential VIII: Advanced nursing practice. The final DNP essential discusses the ability of the DNP graduate to perform a comprehensive and systematic assessment of patients in order to make advanced clinical decisions to improve patient outcomes (AACN, 2006). The DNP graduate will develop and maintain patient relationships, as well as relationships with nurses and other interprofessional members of the team (AACN, 2006). The doctoral prepared advanced practitioner will create, implement, and evaluate nursing interventions, while providing support for those undergoing difficult transitions and change (AACN, 2006).

This QI project was designed, implemented, and evaluated in order to provide practice recommendations for CRC screening to improve patient outcomes. To improve system processes, shortcomings must be assessed so recommendations can be made. The success of the QI project was highly dependent on staff participation and buy in. Increased efforts by the staff

should be made in regards to health promotion through preventative screening. The providers should focus their efforts on creating a user-friendly EMR system that incorporates health reminders for the appropriate patients. By utilizing a doctoral prepared advanced practice nurse, appropriate policies and guidelines could be developed and executed to provide optimal health care delivery.

Summary

DNP graduates will practice at the most advanced level of nursing. The eight essentials discussed in this chapter address the competencies that must be gained in order to meet the rigor of a DNP program. By incorporating these essentials in the education of nurses, the graduate is prepared to enhance clinical practice by researching, developing, and implementing quality interventions in everyday health care. The advanced practice nurse will collaborate with members of interprofessional teams to develop policies, procedures, and strategies to effectively and efficiently deliver quality health care. With the ever-changing health care system of our nation, it is critical that providers are able to use critical thinking and advanced clinical judgement to influence practice and make suggestions for future research and quality improvement efforts.

Chapter Eight: Final Conclusions

The purpose of this project was to increase provider referral rates for colorectal cancer (CRC) screening by utilizing a questionnaire as a reminder system for the providers to recommend the appropriate patients for a colonoscopy or Cologuard screening. An evaluation of the implementation phase allowed the DNP student to assess the significance of the findings, project strengths, weaknesses, limitations, and benefits. This assessment enabled the DNP student to evaluate the project and clinic's strengths and shortcomings to make future practice recommendations.

Significance of Findings

The clinical significance of this project is twofold. This project demonstrated the importance of an established protocol for adherence to consistent provider referral for CRC cancer screening. When questionnaires were given to the providers, their referral rate was 100%. This proves that a simple, low-cost intervention has potential to have major impact on screening referrals and rates. Secondly, the project demonstrated that staff compliance and buy-in is especially important when implementing a routine protocol. Adherence to bi-weekly PDSA cycles and revisions proved to be an effective method of obtaining feedback to increase staff compliance for distribution of the questionnaires. After week nine, there was a 30% increase in questionnaire distribution after obtaining feedback and implementing one simple intervention. With 17 CRC screening referrals made in twelve weeks, the potential impact that established protocols could have for primary care practices is substantial. Ultimately, increasing the rates of CRC screening could save many lives and decrease heath care costs by recognizing and treating CRC in its early stages.

Project Strengths

The strengths of this project included low implementation cost, a simple project plan, a small and engaged project site and staff, and the ease of replicating the project at other practices in the future. Spending approximately $47 for a twelve-week project implementation is a very low cost project, which makes transferability to other practices more feasible and appealing. A simple plan of distributing screening questionnaires to all appropriate aged patients as a reminder for the providers to discuss and refer patients for screening made this project easy to implement and easy to replicate. A small and engaged project site and staff enabled the student to meet often and directly with those participating to obtain feedback. This allowed changes to be made and communicated to all participants in a quick and efficient manner. Because of the above reasons listed, recreating this project in other organizations that are having trouble meeting screening standards would be easy.

Another strength of this project was that there was a lot of evidence-based research available regarding interventions that have proven to work in other facilities. Provider reminder systems were recognized as a successful method to increase provider referrals for screening, which is what prompted the DNP student's project intervention. There are a variety of ways to implement reminder systems, which the DNP student was able to tailor to the practice where the project took place at. This project was also based on strong theoretical principles pertaining to health promotion and preventative care regarding healthcare screening.

Project Limitations

The primary project limitation was that the distribution of questionnaires was dependent on the medical office assistant (MOA) or secretary. Although the staff had adequate buy-in and participation, there was no method in place for ensuring these questionnaires were distributed

when personnel were sick, busy, or forgot. The small clinic site was beneficial in many ways, but was also considered a limitation due to fewer number of personnel available to distribute questionnaires. In order to eliminate human error, there would have to be a computerized reminder system.

Another weakness to this project was the lack of comparison data to measure pre- and post-intervention screening rates. Although the project was able to definitively show that a reminder system led to 100% screening rates, there was not a way to assess if this intervention increased this practice's overall screening referral rates. There was also not a way to follow up on the screening referrals to assess whether the patients had gotten a colonoscopy or participated in Cologuard screening. Although the goal of the project was to increase provider referral rates, it would be beneficial for future research to see whether these referrals increased CRC screening rates.

Project Benefits

One benefit of this project was that it brought attention to the importance of a provider reminder system for increasing CRC screening referrals. Although distributing the questionnaire had its barriers, this project was able to show that when reminded, providers routinely referred their patients for screening. This project also benefited this specific practice by demonstrating how valuable an automatic reminder system would be to incorporate into the office EHR system to increase provider screening referral compliance. It also increased patient and staff awareness of the importance of screening for CRC, as well as how far a simple intervention can go in improving the rate of referrals. The ultimate goal for improving provider referral rates is to in turn increase screening rates that could potentially save lives and reduce healthcare spending. According to the National Institute of Health (NIH) (n.d.), the annualized mean net cost of initial

care of a patient with CRC is $51,327, with continuing care averaging around $3,159 per year. Literature has consistently proven that any type of screening is more cost effective than no screening at all (Rex et al., 2017). Focusing on screening measures improves patient care, patient satisfaction, and patients' overall health. CRC screening meets Triple Aims objectives, as well as Healthy People 2020 objectives.

Practice Recommendations

Based on project findings, the first recommendation would be to institute a CRC screening reminder into the office EHR system for all appropriate patients. This reminder system could be tailored to include other screening reminders as well, such as mammograms, immunizations, and other preventative care measures. The staff at the project site admitted that the site's EHR system is outdated and this project further validated that an updated system could provide substantial benefit to this clinic. Eliminating human error and additional tasks to an already busy staff by incorporating the reminder system to the EHR would be the best option. Establishing specific practice protocols is crucial in this practice to help avoid missing recommendation and necessary screenings.

Secondly, following up with those who were referred for screening to assess whether they participated or not would be recommended. This would allow the barriers of screening to be investigated and other projects to be done to help reduce those barriers and increase screening rates.

Final Summary

CRC screening can detect cancer in its early, treatable stages, saving money on treatment and reducing morbidity and mortality. The national recommendation to screen all adults ages 50 to 75 should not be overlooked due to lack of established protocols or a lag in technology. The

purpose of this DNP project was to increase provider referrals of CRC screening in a primary care setting, which would ultimately increase CRC screening rates. During the twelve-week implementation period, a questionnaire was distributed to appropriate patients to complete and give to their provider at their appointment. This reminded the provider to discuss CRC screening and refer the patient if indicated. When receiving this reminder, the provider discussed and placed referrals for screening 100% of the time. Incorporating reminder systems for providers in primary care practices could drastically increase referral rates, and therefore screening rates. This would improve the overall health of the nation and reduce healthcare costs.

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Appendix A

Literature Review Matrix

NURS 8269: DNP Project I Literature Review Matrix				
Student: Nicole Freeman			**Date of Submission:**	
Faculty: Kosko				
Project Title: Increasing Colorectal Cancer Screening in a Primary Care Clinic				
Article (APA Citation)	**Level of Evidence** (I to VII)	**Data/Evidence Findings**	**Conclusion or Summary**	**Use of Evidence in EBP Project Plan**
American Cancer Society. (n.d.) What can primary care physicians do to advance 80% by 2018? Retrieved from http://nccrt.org/wp-content/uploads/14893-80_2018-PROVIDER-PHYS-4-PAGER-11-10.pdf	Level VII	90% of patients who received a recommendation from a provider participated in CRC screening	Provider recommendations are proven to increase CRC screening adherence	Incorporate provider recommendation as an intervention in the project site in order to increase CRC screening

Dougherty, M. K., Brenner, A. T., Crockett, S. D., Gupta, S., Wheeler, S. B., Coker-Schwimmer, M., . . . Reuland, D. S. (2018). Evaluation of interventions intended to increase colorectal cancer screening rates in the united states: A systematic review and meta-analysis. *JAMA Internal Medicine, 178*(12), 1645. doi:10.1001/jamainternmed.2018.4637	Level I	Interventions that increased CRC screening were FBT outreach, patient navigation, patient education, patient reminders, clinician interventions of academic detailing, and clinician reminders. Combination of interventions increased CRC screening more than single interventions.	Fecal blood test outreach and patient navigation were associated with increased CRC screening rates. FBT outreach should be included in screening programs.	Include fecal blood test (Cologuard) as an option for CRC screening at this primary care facility. Utilize the questionnaire as a clinician reminder to ask patient about CRC screening. Use a combination of interventions to increase screening adherence.
Healthy People, 2020. (n.d.). Colorectal cancer: Screening in adults ages 50 to 75. Retrieved from https://www.healthypeople.gov/2020/tools-resources/evidence-based-resource/colorectal-cancer-screening-in-adults-ages-50-to-75	Level VII	The three objectives for CRC screening are decreasing CRC death rates, decreasing the incidence of invasive CRC, and increasing screening in the population to 70%.	The goal of CRC screening is to increase screening to 70% of the population.	Incorporate evidence-based intervention a primary care practice in order to increase screening rates to get to the Healthy People 2020 goal.
Community Preventative Services Task Force. (2016). Cancer screening: Multicomponent interventions-colorectal. Retrieved from https://www.thecommunityguide.org/findings/cancer-screening-multicomponent-	Level I	Multiple interventions are proven to increase CRC screening.	Provider reminder systems and small media are evidence-based interventions proven to increase CRC screening	Incorporate a provider reminder and patient education in the primary care clinic to increase CRC screening

interventions-colorectal-cancer				
Honein-AbouHaidar, G. N., Kastner, M., Vuong, V., Perrier, L., Daly, C., Rabeneck, L., . . . Baxter, N. N. (2016). Systematic review and meta-study synthesis of qualitative studies evaluating facilitators and barriers to participation in colorectal cancer screening. Cancer Epidemiology, Biomarkers & Prevention : A Publication of the American Association for Cancer Research, Cosponsored by the American Society of Preventive Oncology, 25(6), 907-917. doi:10.1158/1055-9965.EPI-15-0990	Level V	There are multiple facilitators, barriers, and modifying factors that impact CRC screening	Facilitators: individual awareness of CRC screening and its purpose, having a positive attitude toward screening tests, and having motivation to get screened. Barriers include lack of awareness of CRC screening and its purpose, negative views of cancer, negative views of screening tests, and lack of motivation. Modifying factors include public education and provider recommendation	Incorporate provider recommendations and education as interventions to increase awareness of CRC screening, which increases screening rates.
Peterson, E. B., Ostroff, J. S., DuHamel, K. N., D'Agostino, T. A., Hernandez, M., Canzona, M. R., & Bylund, C. L. (2016). Impact of provider-patient communication on cancer screening adherence: A systematic review. Preventive Medicine, 93, 96-105.	Level V	A positive association between provider recommendation and patient screening adherence was present in almost every study	Provider recommendations increase CRC screening. The amount of provider enthusiasm and encouragement perceived by patients was one of the strongest indicators of screening adherence.	Include provider recommendation as an intervention in the primary care office to increase CRC screening.

doi:10.1016/j.ypmed.2016.09.034				
Bibbins-Domingo, K., Grossman, D. C., Curry, S. J., Davidson, K. W., Epling, J. W., García, F. A. R., . . . US Preventive Services Task Force. (2016). Screening for colorectal cancer: US preventive services task force recommendation statement. *Jama*, *315*(23), 2564-2575.	Level VII	Screening for CRC in average risk adults aged 50-75 is very beneficial. There are different screening strategies available, but none of these prove to be of more benefit than another.	CRC screening substantially reduces death from CRC and not enough adults in the US are being screened.	There are advantages and disadvantages of all the screening methods. There is not a one size fits all approach, and physicians should provide patients with options so they can make an informed decision. Screening of any kind will result in a reduction in CRC deaths
Brenner, H., Kloor, M., & Pox, C. P. (2014). Colorectal cancer. *Lancet, The*, *383*(9927), 1490-1502. doi:10.1016/S0140-6736(13)61649-9	Level VII	Incidence and mortality for CRC is high, especially in the US. Discusses background of CRC	CRC is a serious and fatal cancer, but can be detected early and reduce incidence by screening	Background and significance of problem. 600,000 deaths a year, 1-2 million new cases a year. Prognosis is based on stage of CRC

Rex, D. K., Boland, C. R., Dominitz, J. A., Giardiello, F. M., Johnson, D. A., Kaltenbach, T., . . . Robertson, D. J. (2017). Colorectal cancer screening: Recommendations for physicians and patients from the U.S. multi-society task force on colorectal cancer. *The American Journal of Gastroenterology, 112*(7), 1016-1030. doi:10.1038/ajg.2017.174	Level VII	CRC screening recommendations for US Multi-Society Task Force on Colorectal Cancer	Screening tests are ranked in 3 tiers based on performance, features, costs, and practical considerations	Cost of Cologuard vs. FIT, useful information on different screening modalities
Strain, A. N., Waling, C. C., & Stewart, F. D. (2018). Noninvasive colorectal cancer screening. *The Clinical Advisor : For Nurse Practitioners, 21*(1), 24-33.	Level V	Providers should focus on maximizing the number of patients that participate in CRC screening, no matter the method	Stool based tests are both evidence-based tests that are reliable in detecting CRC, and offering less invasive tests can increase screening	Compares FIT vs Cologuard, listing advantages and disadvantages of both. Evidence shows patients find these tests more attractive than colonoscopy.
Triantafillidis, J. K., Vagianos, C., Gikas, A., Korontzi, M., & Papalois, A. (2017). Screening for colorectal cancer: The role of the primary care physician. *European Journal of Gastroenterology & Hepatology, 29*(1), e1-e7. doi:10.1097/MEG.0000000000000759	Level V	Multiple studies prove provider reminder systems increase CRC screening	The improvement of CRC screening largely depends on primary care providers implementing effective systems for discussing screening with patients	Instill provider reminder system at project site to increase provider recommendation of screening, which will increase screening adherence

Geneve, N., DO, Kairys, D., MD, Bean, B., DO, Provost, T., DO, Mathew, R., DO, & Taheri, N., DO. (2018). Colorectal cancer screening. *Primary Care: Clinics in Office Practice, 46*(1), 135-148. doi:10.1016/j.pop.2018.11.001	Level VII	Risk factors for CRC, considerations for office practice, different screening methods and recommendations	CRC can be reduced with an effective CRC screening program. Patient education is key.	Provides background information on CRC, risk factors, and screening methods. Also discussed the importance of the role of the physician.
Alberti, L., Garcia, D., Coelho, D., De Lima, D., & Petroianu, A. (2015). How to improve colon cancer screening rates. *World Journal of Gastrointestinal Oncology, 7*(12), 484-491. doi:10.4251/wjgo.v7.i12.484	Level VII	Multiple strategies are used to increase CRC screening rates, including physician recommendation, provider reminders, and developing a screening policy.	Physician recommendation, provider reminders, and developing a screening policy all improve CRC screening rates.	Create a reminder system for physicians to help them remember to recommend CRC screening. Limitations: not a study or systematic review.

Appendix B

Colorectal Cancer Screening Questionnaire- English

DATE: _____

[redacted]

Colon Cancer Screening
Patient Questionnaire

1. Have you had a colonoscopy in the past? YES NO
   If yes, when?_____

2. Have you had a stool-based screening for colorectal cancer? YES NO
   If yes, when?_____

3. Do you have a family history of colon cancer or adenomas? YES NO

4. Do you have a history of polyps? YES NO

5. Have you had a positive colon cancer screening test in the past 6 months? YES NO

6. Have you ever been diagnosed with ANY of the following: YES NO
   - Inflammatory Bowel Disease (IBD)
   - Chronic ulcerative colitis (CUC)
   - Crohn's disease
   - Familial adenomatous polyposis (FAP)

7. Have you ever been diagnosed with relevant familial cancer syndrome, such as: YES NO
   - Hereditary non-polyposis colorectal cancer syndrome (HNPCCC or Lynch Syndrome)
   - Peutzleghers Syndrome
   - MYH-Associated Polyposis (MAP)
   - Gardner's syndrome
   - Torcot's syndrome
   - Cowden's syndrome
   - Juvenile Polyposis
   - Cronkhite-Canada syndrome
   - Neurofibromatosis
   - Familias Hyperplastic Polyposis

FOR PROVIDER

Screening Recommended (circle one):

Colonoscopy Cologuard Patient Refused Patient up to date

Appendix C

Colorectal Screening Questionnaire- Spanish

FECHA:_____

[redacted]

Detección de cáncer de colon
Cuestionario de paciente

1. ¿Ha tenido una colonoscopia en el pasado? SÍ NO
   ¿Si sí, cuándo?_____
2. ¿Se ha realizado una prueba de detección de cáncer colorrectal a base de heces? SÍ NO
   ¿Si sí, cuándo?_____
3. ¿Tiene antecedentes familiares de cáncer de colon o adenomas? SÍ NO
4. ¿Tiene antecedentes de pólipos? SÍ NO
5. ¿Ha tenido una prueba de detección de cáncer de colon positiva en los últimos 6 meses? SÍ NO
6. ¿Alguna vez le han diagnosticado ALGUNO de los siguientes: SÍ NO
   - Enfermedad intestinal inflamatoria (IBD)
   - Colitis ulcerosa crónica (CUC)
   - Enfermedad de Crohn
   - Poliposis adenomatosa familiar (PAF)
7. ¿Alguna vez le han diagnosticado un síndrome de cáncer familiar relevante, como: SÍ NO
   - Cáncer colorrectal hereditario no asociado a poliposis.
   - síndrome (HNPCCC o síndrome de Lynch)
   - Síndrome de Peutzleghers
   - Poliposis asociada a MYH (MAP)
   - El síndrome de Gardner.
   - El síndrome de Torcot.
   - El síndrome de Cowden.
   - Poliposis juvenil
   - Síndrome de Cronkhite-Canadá
   - Neurofibromatosis
   - Poliposis Hiperplásica Familias

PARA EL PROVEEDOR

Screening Recommended (circle one):

Colonoscopy Cologuard Patient Refused Patient up to date

Appendix D

Screen For Life Basic Facts on Screening

COLORECTAL CANCER SCREENING

What Is Colorectal Cancer?

Colorectal cancer is cancer that occurs in the colon or rectum. Sometimes it is called colon cancer. The colon is the large intestine or large bowel. The rectum is the passageway that connects the colon to the anus.

Screening Saves Lives

Colorectal cancer is the second leading cancer killer in the United States, but it doesn't have to be. If you are 50 or older, getting a colorectal cancer screening test could save your life. Here's how:

- Colorectal cancer usually starts from precancerous polyps in the colon or rectum. A polyp is a growth that shouldn't be there.
- Over time, some polyps can turn into cancer.
- Screening tests can find precancerous polyps, so they can be removed before they turn into cancer.
- Screening tests also can find colorectal cancer early, when treatment works best.

Who Gets Colorectal Cancer?

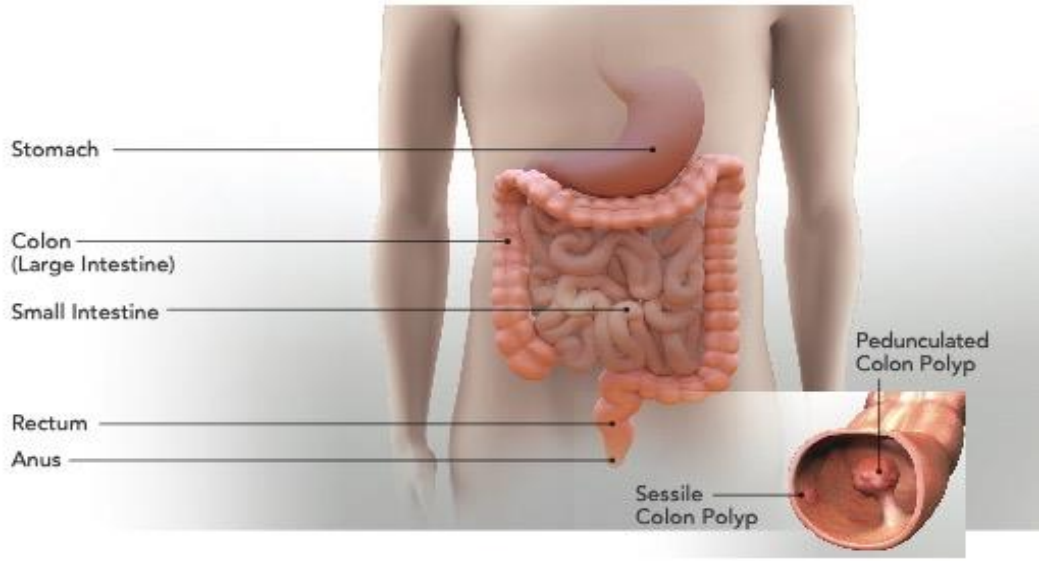
- Both men and women can get it.
- It is most often found in people 50 or older.
- The risk increases with age.

Are You at Increased Risk?

Your risk for colorectal cancer may be higher than average if:

- You or a close relative have had colorectal polyps or colorectal cancer.
- You have inflammatory bowel disease, Crohn's disease, or ulcerative colitis.
- You have a genetic syndrome such as familial adenomatous polyposis (FAP) or hereditary nonpolyposis colorectal cancer.

People at increased risk for colorectal cancer may need earlier or more frequent tests than other people. Talk to your doctor about when to begin screening, which test is right for you, and how often you should be tested.



Colorectal Cancer Can Start With No Symptoms

Precancerous polyps and early-stage colorectal cancer don't always cause symptoms, especially at first. This means that someone could have polyps or colorectal cancer and not know it. That is why having a screening test is so important.

What Are the Symptoms?

Some people with colorectal polyps or colorectal cancer do have symptoms. They may include:

- Blood in or on your stool (bowel movement).
- Stomach pain, aches, or cramps that don't go away.
- Losing weight and you don't know why.

If you have any of these symptoms, talk to your doctor. They may be caused by something other than cancer. However, the only way to know is to see your doctor.

Types of Screening Tests

The U.S. Preventive Services Task Force recommends that adults aged 50–75 be screened for colorectal cancer. The decision to be screened after age 75 should be made on an individual basis. If you are aged 76–85, ask your doctor if you should be screened.

Several different screening tests can be used to find polyps or colorectal cancer. They include:

Stool Tests

Guaiac-based Fecal Occult Blood Test (gFOBT): uses the chemical guaiac to detect blood in stool. At home you use a stick or brush to obtain a small amount of stool. You return the test to the doctor or a lab, where stool samples are checked for blood.

Fecal Immunochemical Test (FIT): uses antibodies to detect blood in the stool. You receive a test kit from your health care provider. This test is done the same way as gFOBT.

FIT-DNA Test (or Stool DNA test): combines the FIT with a test to detect altered DNA in stool. You collect an entire bowel movement and send it to a lab to be checked for cancer cells.

How Often: gFOBT Once a year. FIT Once a year. FIT-DNA once every one or three years.

Flexible Sigmoidoscopy

For this test, the doctor puts a short, thin, flexible, lighted tube into your rectum. The doctor checks for polyps or cancer inside the rectum and lower third of the colon.

How Often: Every five years, or every 10 years with a FIT every year.

Colonoscopy

Similar to flexible sigmoidoscopy, except the doctor uses a longer, thin, flexible, lighted tube to check for polyps or cancer inside the rectum and the entire colon. During the test, the doctor can find and remove most polyps and some cancers. Colonoscopy also is used as a follow-up test if anything unusual is found during one of the other screening tests.

How Often: Every 10 years.

CT Colonography (Virtual Colonoscopy)

Computed tomography (CT) colonography, also called a virtual colonoscopy, uses X-rays and computers to produce images of the entire colon. The images are displayed on a computer screen for the doctor to analyze.

How Often: Every five years.

Which Test is Right for You?

There is no single "best test" for any person. Each test has advantages and disadvantages. Talk to your doctor about which test or tests are right for you and how often you should be screened.

Free or Low-Cost Screening

Colorectal cancer screening tests may be covered by your health insurance policy without a deductible or co-pay. Where feasible, CDC's Colorectal Cancer Control Program grantees provides free or low-cost screenings to eligible men and women. To find out more visit www.cdc.gov/cancer/crccp/contact.htm.

The Bottom Line

If you're 50 or older, talk with your doctor about getting screened. For more information, visit www.cdc.gov/screenforlife or call 1-800-CDC-INFO (1-800-232-4636). For TTY, call 1-888-232-6348.

U.S. Department of Health and Human Services
Centers for Disease Control and Prevention

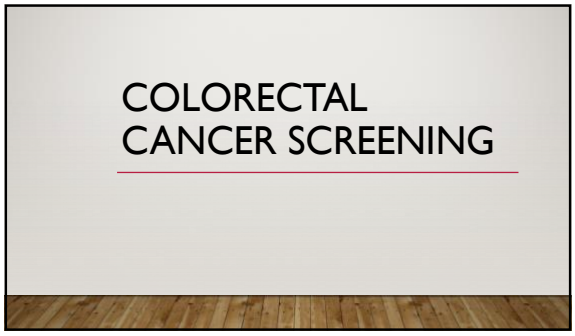
Screen for life
National Colorectal Cancer Action Campaign

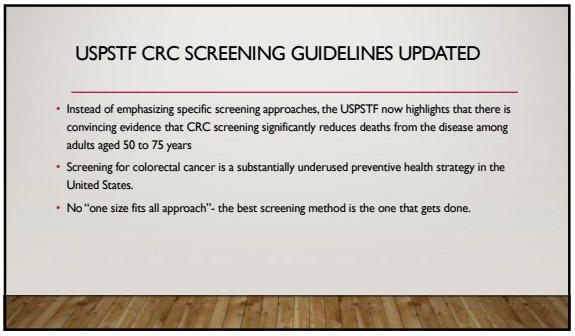
www.cdc.gov/screenforlife
1-800-CDC-INFO

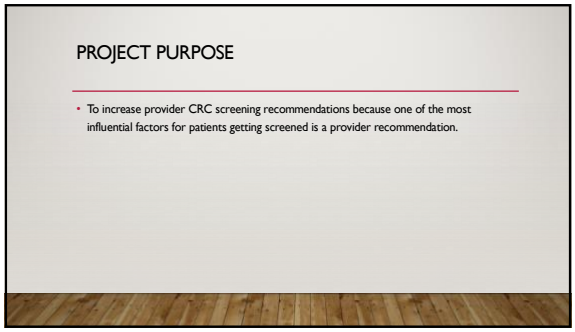
CDC Publication #99-6949, Revised April 2017

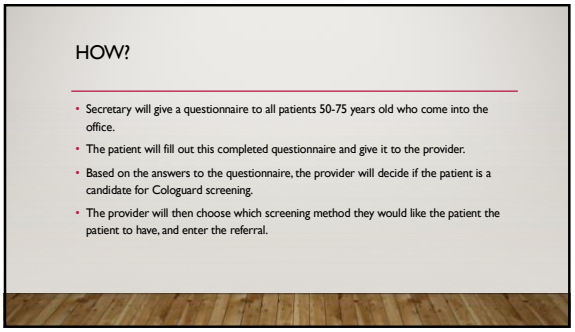
Appendix E

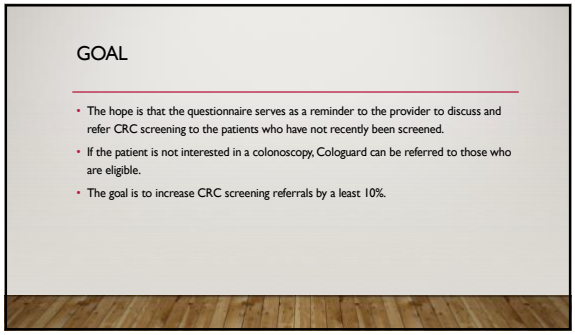
Staff Education

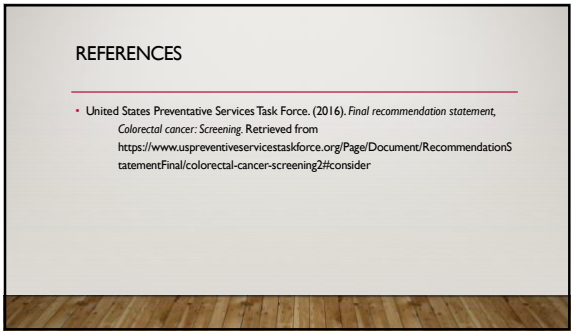












Appendix F

Site Letter of Support

[redacted]
1[redacted]0
Charlotte NC 28209
704-523-2565 phone
704-527-6708 fax

April 8, 2019

Re: Nicole Freeman

To East Carolina University College of Nursing:

I am writing to you today on behalf of Nicole Freeman. I have reviewed her DNP project proposal "Increasing Colorectal Cancer Screening in a Primary Care Clinic", on behalf of my practice I support and approve Ms. Freeman to conduct her project in my practice. I understand that the time frame for this project is from the date of this letter through April 2020, with projected implementation occurring between August and November 2019, but may be subject to change. I understand that in order for Ms. Freeman to achieve completion of the DNP program, dissemination of the project will be required by the University, which will include a public presentation related to the project and a manuscript submission will be encouraged.

I feel that Ms. Freemans project will be a good initiative for quality improvement. My practice is aware that this project will be processed through the University and Medical Center Internal Review Board of East Carolina University (UMCIRB). My practice does not have an Internal Review Board (IRB). Thank you for your time.

Sincerely,

[redacted]

Appendix G

Project Budget Analysis

Supplies	Unit Cost	Quantity	Total
Printing Materials			
CRC Screening Questionnaire	$.05 per page	100	$.5.00
Patient Education Pamphlet	$.05 per page x 2 pages	100	$10.00
Patient Screening Record	$.05 per page	3 pages	$0.15
Staff Education Handout	$.05 per page	7 employees	$0.35
Food			
Educational breakfast	$21 total	Bulk order	$21
Snacks during implementation	$1.50	10	$15
Supplies			
Folder for questionnaires	$1.19 per folder	1 folder	$1.19
Total Budgeted Cost			47.69

Appendix H

Patient Screening Record

CRC Patient Screening Record

Date	# of patients 50-75 years old who came into the office	# of patients who submitted screening questionnaire

Appendix I

IRB Approval

Is this a multi-site project (e.g. there is a coordinating or lead center, more than one site participating, and/or a study-wide protocol)?

○ Yes
● No

Is this a systematic investigation designed with the intent to contribute to generalizable knowledge (e.g. testing a hypothesis; randomization of subjects; comparison of case vs. control; observational research; comparative effectiveness research; or comparable criteria in alternative research paradigms)?

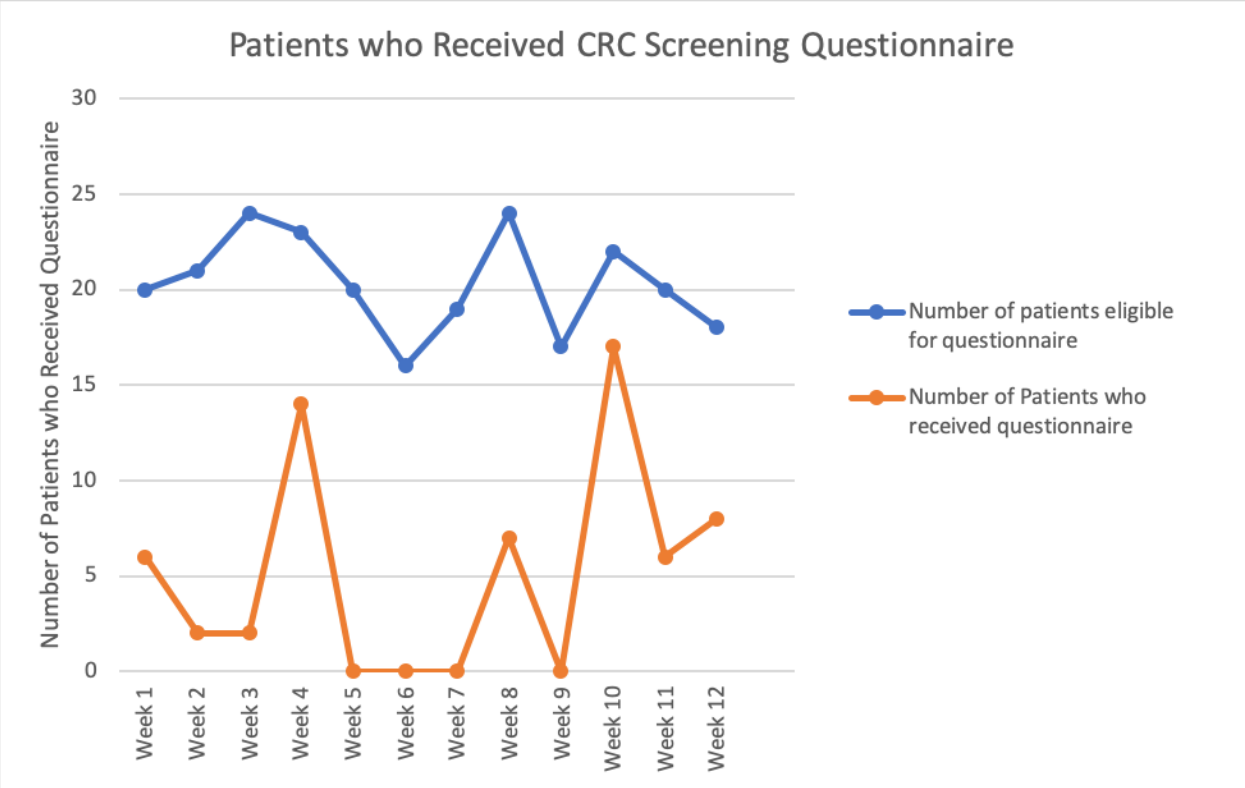
○ Yes
● No

Will the results of the project be published, presented or disseminated outside of the institution or program conducting it?

○ Yes
● No

Based on your responses, the project appears to constitute QI and/or Program Evaluation and IRB review is not required because, in accordance with federal regulations, your project does not constitute research as defined under 45 CFR 46.102(d). If the project results are disseminated, they should be characterized as QI and/or Program Evaluation findings. Finally, if the project changes in any way that might affect the intent or design, please complete this self-certification again to ensure that IRB review is still not required. Click the button below to view a printable version of this form to save with your files, as it serves as documentation that IRB review is not required for this project. 6/18/2019

Appendix J


Patients who Received CRC Screening Questionnaire
Number of Patients who Received Questionnaire
30
25
20
15
10
5
0
Week 1
Week 2
Week 3
Week 4
Week 5
Week 6
Week 7
Week 8
Week 9
Week 10
Week 11
Week 12
Number of patients eligible for questionnaire
Number of Patients who received questionnaire